LAB ASSIGNMENT 1: [DATA VISUALISATION]

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INTRODUCTION:

Inequalities in society and poor mental health are the driving impulses that cause people to make mistakes [1]. Homicides and suicides are two key aspects that have an impact on a country's peace and security. A homicide occurs when someone kills another individual. A suicide, on the other hand, is when someone kills themself. The rising number of killings and suicides has a direct or indirect impact on the country's development. Homicide rates that exceed a specific threshold can have immediate and long-term consequences for human well-being, as well as long-term implications for economic growth, social development, and security. Homicide does not only affect the marginalised; it can affect everyone, regardless of age, gender, ethnicity, or socioeconomic class. Because homicide affects people from all walks of life, it is necessary to look into all facets of the crime." Homicide took the lives of just over 415,000 individuals in 2019, according to the Global Burden of Disease survey. Homicide is the leading cause of death in Latin America for people aged 15 to 49. Homicide kills twice as many teenagers as automobile accidents."

BODY:

I have taken a dataset which is used to visualise the relationship between homicides, suicides and GDP. There are several questions that can be answered from this dataset out of which we will be looking into three main questions, they are:

What has been the global intentional homicide rate per 100,000 population trend in the last eighteen years?

Homicide is a major murderer around the world, and it's one of the main causes of death in various countries [3]. Homicides are critical issue that needs to be identified and monitored globally.

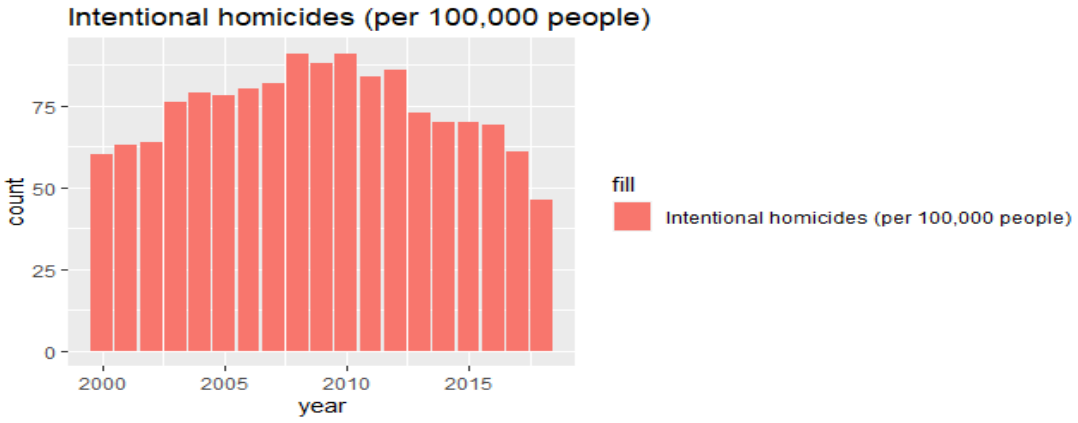

Fig 1: total intentional homicides per 100,000 people

The bar chart above shows the global intentional homicides (per 100,000 people) from 2000 to 2018. It is evident from the chart that the trend had taken an upward surge. It had reached its

peak in the years 2008 and 2010. However, from 2011 to 2018, there was a steady decline in overall intentional homicide rates, with some minor swings.

What are the differences in homicide rates between countries of various income levels?

Domestic disagreements, interpersonal violence, violent battles over land resources, intergang violence over turf or control, and predatory violence and killing by armed organisations are all factors that contribute to intentional homicides [4]. The countries included in the dataset are divided into three groups: low income, lower middle income, and upper middle income. I've chosen three countries to represent these three socioeconomic levels for a better understanding of the change in homicidal rate throughout time.

Low-income country:

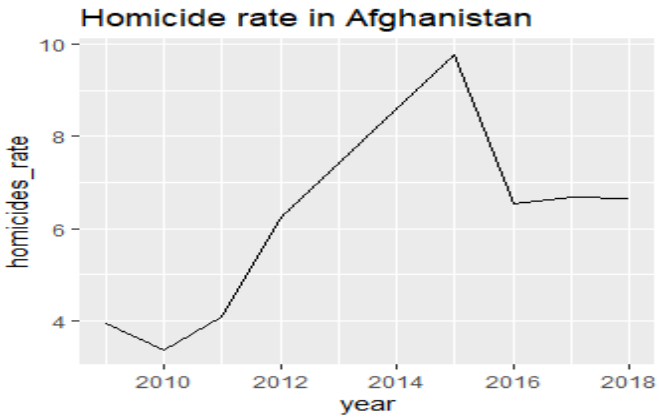

Fig 2: Homicide rate in Afghanistan

Afghanistan is being analysed for a trend study among low-income countries. Corruption, contract killings or assassinations, robbery, bombing, and other forms of crime are common in Afghanistan. The graph plainly illustrates that over the last decade, the homicide rate has increased. In 2008, homicide rates were around 4, but by 2015, they had progressively grown to around 10. The number of intentional homicides per 100,000 people had fallen by three by 2016. It had plateaued since then till 2018. These homicidal acts occur because there is a low unemployment rate among a huge population. Due to weak governance, there have also been various riots within the country.

Lower middle income:

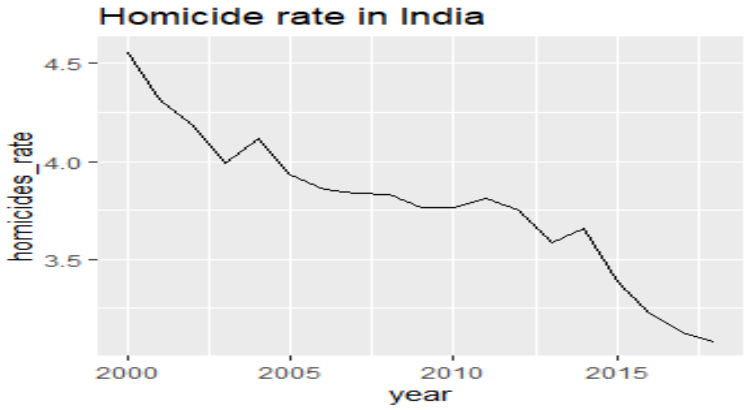

Fig 3: Homicide rate in India

India is the country that is being considered for the lower middle class. Domestic violence homicides and suicides are common causes of death among women in India. The most prevalent cause mentioned was dowry demands, followed by a history of spousal abuse or harassment and family problems [2]. The graph clearly reveals that the homicide rate has been steadily decreasing since 2000. In the last decade, India has seen various economic advances as the murder rate has reduced. This shows that the homicide rate has a direct impact on the country's total economic progress. Even though terrorism dominates the media and public conversation in India, the chances of becoming a homicide victim are far higher. Social disparities must be addressed in order to further reduce overall homicide rates.

Upper middle-income country:

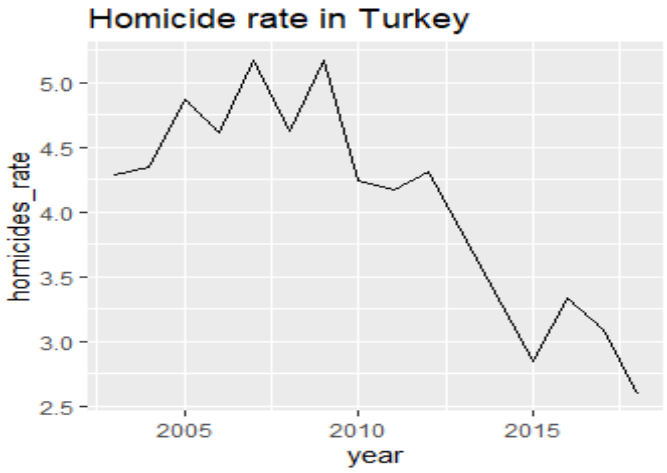

Fig 4: Homicide rate in Turkey

The country chosen for trend analysis is Turkey. From 2003 to 2018, the overall plot shows a noticeable fluctuation. In the years 2007 and 2009, homicidal rates peaked at 5.1, before plummeting to around 4.25 in 2010. The homicidal rate then fluctuated slightly until progressively falling to roughly 2.5 per 100,000 people in the year 2018.

What is suicide and how has the suicide rate trend deviated with respect to the admin region?

Suicides are activities that occur when a patient kills himself / herself. There could be several reasons that trigger a patient to commit suicide. These reasons could be mental issues like depression, bi-polar disorder, physical issues, peer pressure, harassment, discriminations and so on. The impact of a suicide can be devastating to close- circle of their victim. A data visualisation technique is used to identify the trends in which suicide rates are split across several admin regions that are taken into study. The plots are given below.

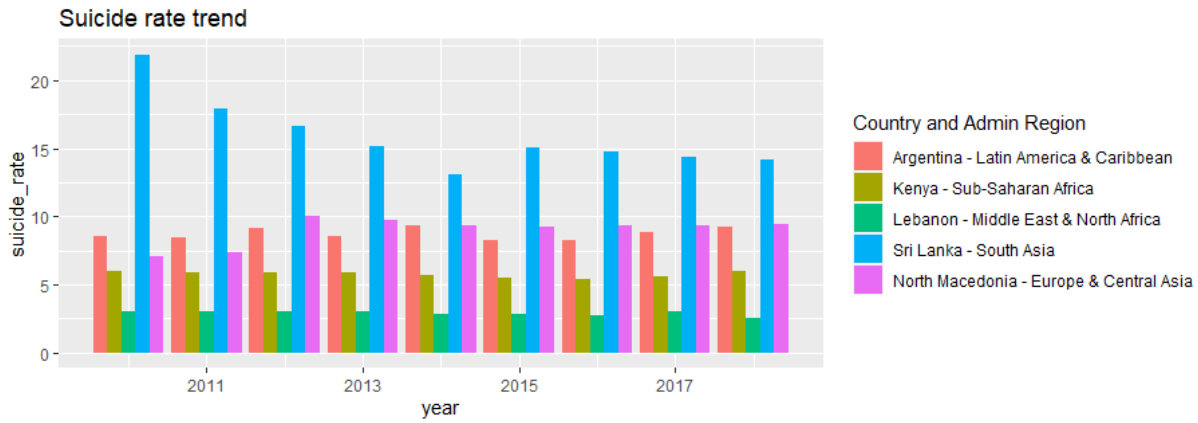

Fig 5: suicide rate trend with respect to country and admin region

The graph showed that suicide rates were highest in South Asia and lowest in the Middle East and North Africa. The total suicide rate in South Asia decreased steadily from 2010 to 2018, with a little variation in 2014-2015. The evolution of suicide rates in Latin America and the Caribbean has shown a continual fluctuation. Furthermore, the overall trend in suicide rates in Europe and Central Asia increased, whereas those in Sub-Saharan Africa stayed stable throughout the period from 2010 to 2018.

Conclusion:

Homicides and suicides are serious issues that needs to be dealt with for the development and betterment of the people within the country. This study is used to visualise the overall trend in which homicides and suicide rates have fluctuated in the past eighteen years. Moreover, specific data about several countries and admin regions were taken for creation and better understanding of the visual plots. The data set was explored and the trend of global intentional homicide rates per 100,000 people over the last eighteen years, homicide rates amongst countries of various income levels, suicide and suicide rate trend variation within the admin region are all visualised.

R- PROGRAM:

```
library(tidyverse)

library(ggplot2)

library(stringr)

library(dplyr)

library(tidyr)

library(scales)

data <- read_csv("C:/Users/abila/OneDrive/Desktop/dataset.csv")

view(data)

# Exploring data

class(data) #data frame

dim(data) #view number of rows and columns
```

```
names(data) #view column names
head(data) #view first few observations
str(data) #view the structure of data
summary(data)
#clean dataset
colSums(is.na(data))
cleandata <- suicide[complete.cases(data),]
view(cleandata)
class(cleandata)
dim(cleandata)
###renaming column names to convinience###
cleandata <- cleandata %>%
  rename(
    "homicides_rate" = "Intentional homicides (per 100,000 people)",
    "suicide_rate" = "Suicide mortality rate (per 100,000 population)",
    "GDP" = "GDP (current US$)",
    "GDP_perCapita" = "GDP per capita, PPP (current international $)")
str(cleandata)
head(cleandata)
###converting character to factor###
cleandata$adminregion <- as.factor(cleandata$adminregion)
cleandata$iso3c <- as.factor(cleandata$iso3c)
cleandata$iso2c <- as.factor(cleandata$iso2c)
cleandata$incomeLevel <- as.factor(cleandata$incomeLevel)
####question1###
subdata <-  cleandata[which(cleandata$adminregion == "East Asia & Pacific (excluding high
income)" &
                            cleandata$year == 2008),


                      names(cleandata) %in%
                        c("iso3c","suicide_rate")]
ggplot(data = subdata, aes(fill=iso3c,x=suicide_rate, y= round(max(suicide_rate)))) +
  geom_line(position_dodge(width= 1), stat="identity")
```

```
ggplot(data=cleandata)+
  geom_bar(aes(x=year, fill= "Intentional homicides (per 100,000 people)")
  ) +
ggtitle("Intentional homicides (per 100,000 people)")
####question2### how each income type country differs by homicide rate
#low income
subdata <-  cleandata[which(cleandata$country == "Afghanistan"),
                      names(cleandata) %in%
                        c("year","homicides_rate")]

ggplot(subdata, aes(x=year, y=homicides_rate,)) +
  geom_line() +
  ggtitle("Homicide rate in Afghanistan")

#lower middle
subdata <-  cleandata[which(cleandata$country == "India"),
                      names(cleandata) %in%
                        c("year","homicides_rate")]

ggplot(subdata, aes(x=year, y=homicides_rate)) +
  geom_line() +
  ggtitle("Homicide rate in India")

#upper middle
subdata <-  cleandata[which(cleandata$country == "Turkey"),
                      names(cleandata) %in%
                        c("year","homicides_rate")]



ggplot(subdata, aes(x=year, y=homicides_rate)) +
  geom_line()+
  ggtitle("Homicide rate in Turkey")
```

```
###question2### suicide rates corresponding to admin region

subdata <-  cleandata[which(cleandata$country == "Sri Lanka" | cleandata$country == "Kenya" | cleandata$country == "Lebanon" | cleandata$country == "Argentina" | cleandata$country == "North Macedonia" ),

                      names(cleandata) %in%

                        c("iso3c","year","suicide_rate")]

subdata <- subdata[which(subdata$year == 2010 | subdata$year == 2011 | subdata$year == 2012 | subdata$year == 2013 | subdata$year == 2014 | subdata$year == 2015 |subdata$year == 2016 |subdata$year == 2017 | subdata$year == 2018 ),

                   names(subdata) %in%

                    c("iso3c","year","suicide_rate")]


ggplot(data = subdata, aes(fill=c(iso3c), x=year, y=suicide_rate)) +

  geom_bar(position="dodge", stat="identity") +

  scale_fill_discrete("Country and Admin Region",

                      labels = c("Argentina - Latin America & Caribbean" ,

                                 "Kenya - Sub-Saharan Africa" ,

                                 "Lebanon - Middle East & North Africa" ,

                                 "Sri Lanka - South Asia" ,

                                 "North Macedonia - Europe & Central Asia")) +

  ggtitle("Suicide rate trend")
```

REFERENCE:

1. Hoffman, M. (2017, January 23). *Guilty or not guilty: Does inequality really lead to murder?* New Scientist. Retrieved May 8, 2022, from https://www.newscientist.com/article/2115938-guilty-or-not-guilty-does-inequality-really-lead-to-murder/
2. Sabri B, Sanchez MV, Campbell JC. Motives and characteristics of domestic violence homicides and suicides among women in India. Health Care Women Int. 2015;36(7):851-66. doi: 10.1080/07399332.2014.971954. Epub 2014 Dec 22. PMID: 25383682.
3. Max Roser and Hannah Ritchie (2013) - "Homicides". *Published online at OurWorldInData.org.* Retrieved from: 'https://ourworldindata.org/homicides' [Online Resource]
4. *Turkey murder/homicide rate 2003-2022*. MacroTrends. (n.d.). Retrieved May 8, 2022, from https://www.macrotrends.net/countries/TUR/turkey/murder-homicide-rate
5. Data source: https://www.kaggle.com/datasets/prasertk/homicide-suicide-rate-and-gdp